

Pruning decisions for premium sparkling wine production

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TIA is a joint venture of the University of Tasmania and the Tasmanian Government



Background

- Cane pruning dominates
- Perceived basal bud infertility is the basis for pruning decision
- Cane pruning is considerably more expensive to carry out
- With mechanisation becoming more common in new larger plantings, it is necessary to re-visit which pruning system is best suited to premium sparkling wine production

Trial Site

- Over 3 seasons; 2010, 2011 and 2012
- 18 year old Coal River Valley premium sparkling wine producing vineyard, pruned by hand to 20 buds
- Pinot Noir (clone D5V12), Chardonnay (clone I10V1)
 - Spur pruned
 - Cane pruned



Results: Canopy

- Pronounced apical dominance under cane pruning



Results: Canopy

- 3 point quadrat assessment dates over the bulk of the canopy growth season, measured in mid November, mid December and mid January
- Canopy assessment for Chardonnay 2010

	Spur Pruned			Cane Pruned		
	25-Nov	22-Dec	28-Jan	25-Nov	22-Dec	28-Jan
Effective Insertions (%) ¹	100	100	100	65	80	100
Leaf contacts	92	116	147	56	92	103
Cluster contacts	2	8	10	3	7	8
Gaps %	0	0	0	35	20	0
Leaf Layer Number(LLN)	2.30	2.90	3.68	1.40	2.30	2.58

Results: Canopy



Spur Pruning



Cane Pruning

Results: Yield distribution

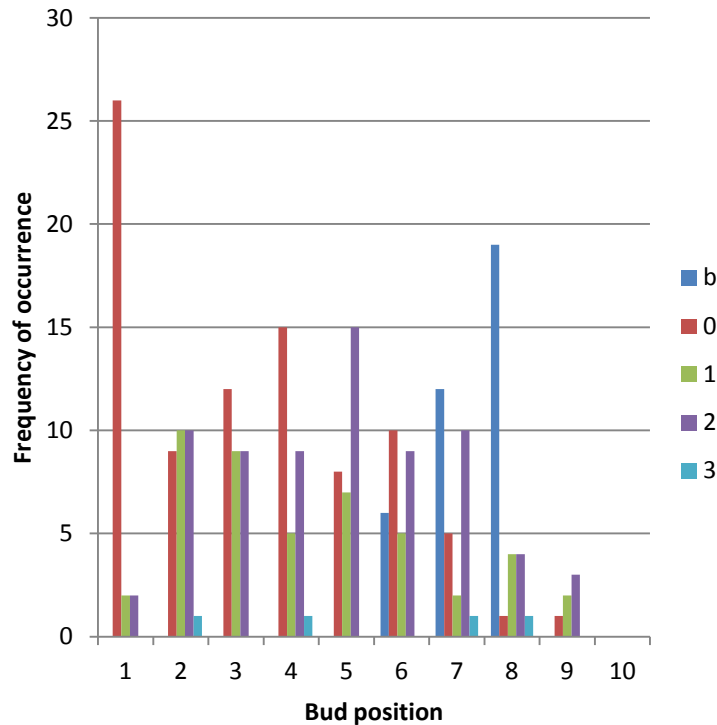
- Apical dominance in canopy growth in chardonnay was mirrored in yield distribution

2010	Basal (buds 1-3)	Mid (buds 4-7)	Apical (buds 8-10)
Yield distribution along cane	13.2%	30.4%	56.4%

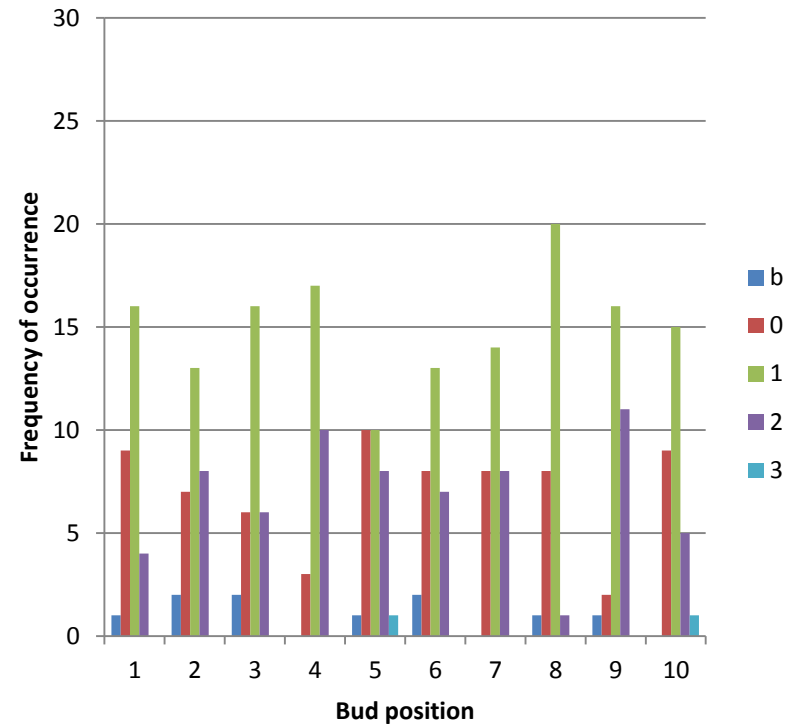
- Large seasonal variability in yield

Results: Yield

- Distribution of fruitfulness for Chardonnay 2012



Cane Pruned



Spur Pruned

Results: bunch numbers

		Bunch number		
		2010	2011	2012
Pinot Noir	Cane pruned	22.87	26.20	17.40
	Spur pruned	25.13	31.87	21.00
	Significance	ns	<0.005	<0.05
Chardonnay	Cane pruned	13.33	21.20	13.33
	Spur pruned	18.73	26.27	19.47
	Significance	<0.001	<0.01	<0.001

- In all cases, cane pruned vines had fewer, but larger bunches

Results: Yield/vine

		Bunch weight (g)		
		2010	2011	2012
Pinot Noir	Cane pruned	122.95a	131.12	105.61
	Spur pruned	100.74b	101.92	85.01
	Significance	0.0003	0.013	0.021
Chardonnay	Cane pruned	104.6	105.21	57.33
	Spur pruned	79.4	90.44	47.94
	Significance	<0.01	ns	ns

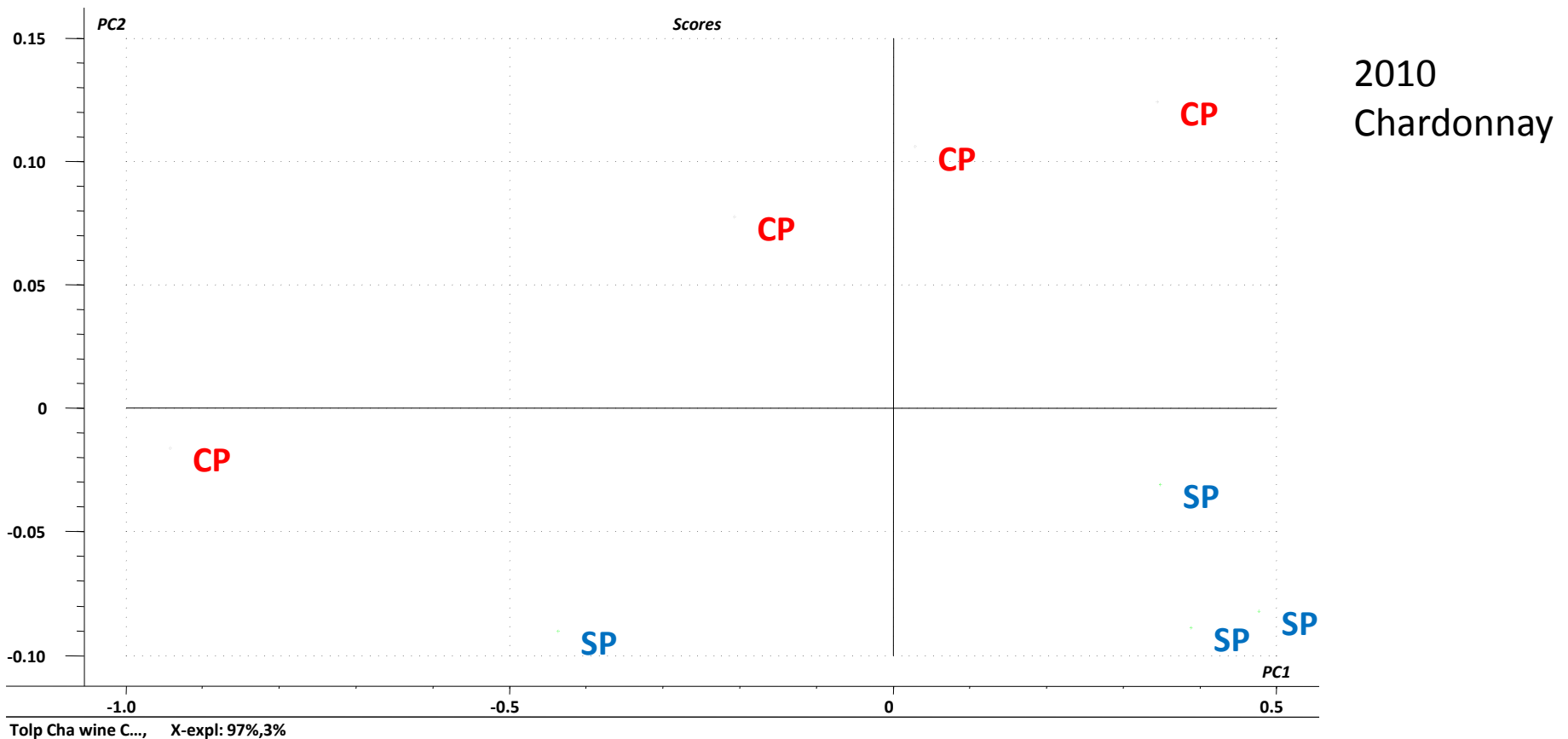
- Yield per vine was not significantly different in any year for Pinot and only in 2012 for Chardonnay, whereby spur pruned vines yielded higher (however both treatments yielded below 1kg/vine).

Results: Basic Fruit Analysis

- There was no difference in TSS, pH nor Titratable Acidity, in any year or either variety.

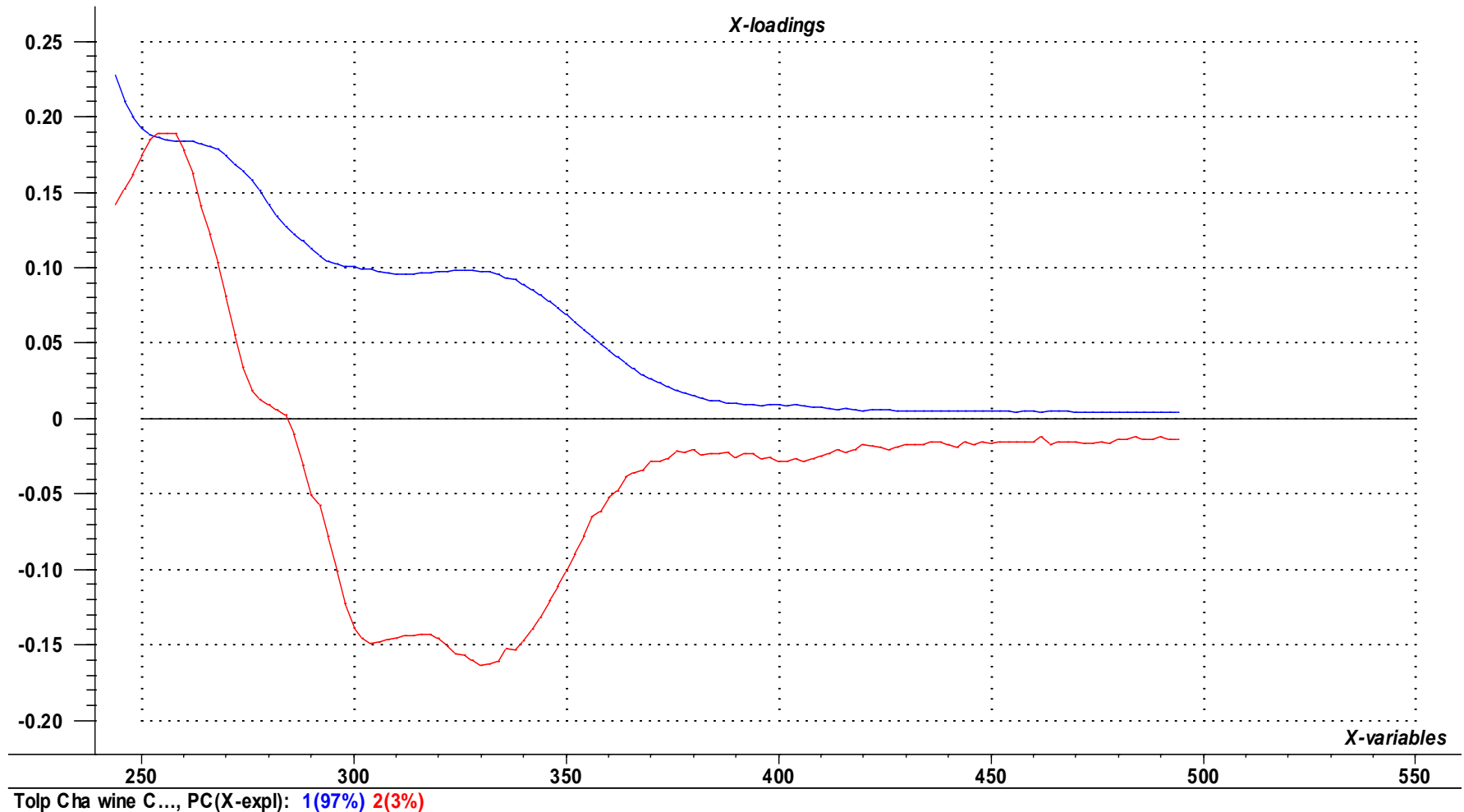
Results: Wine phenolic profiles

- When analysing the base wine spectra, in all years there was distinct separation of the pruning systems



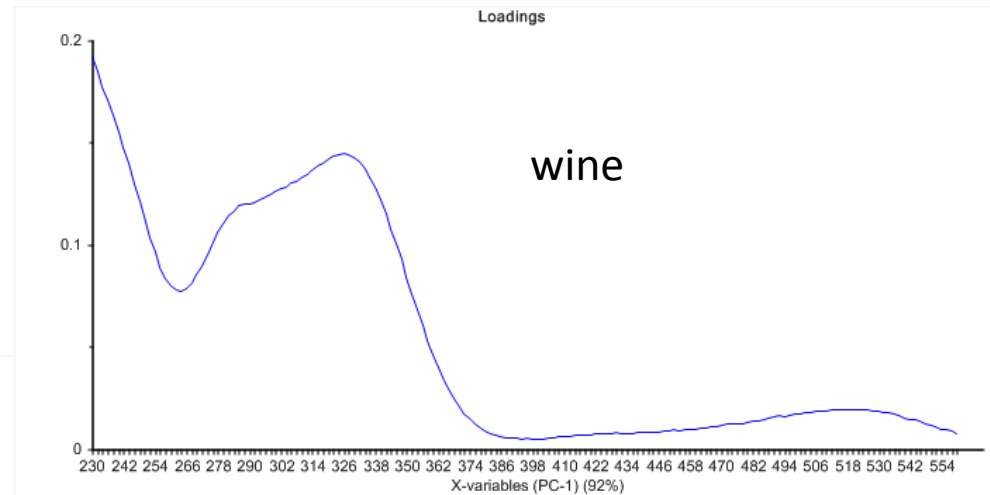
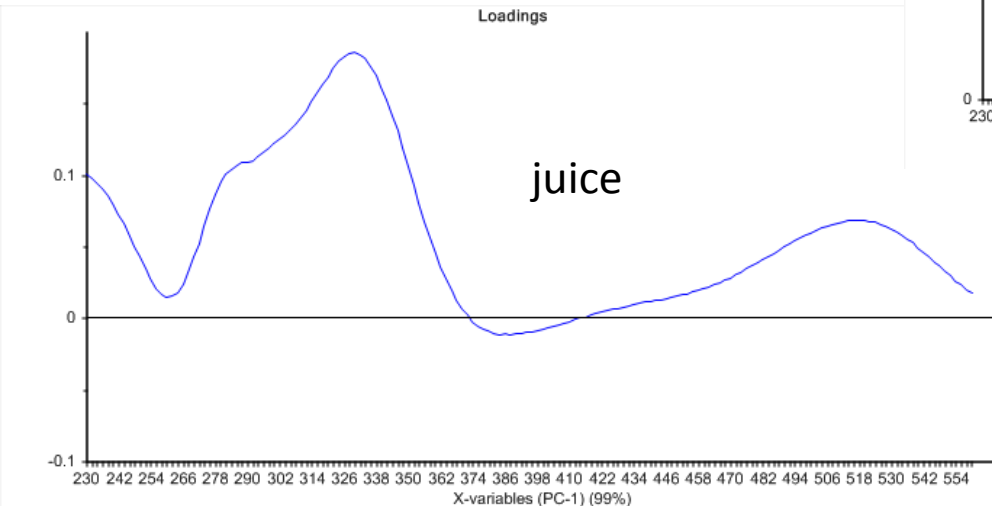
Results: wavelengths affected by treatments

- 2010 Chardonnay, 265, 300 and 330 nm feature
- 280 nm not significant



Results: juice vs wine

- Similarities existed between juice and base wine spectra, however not in all cases
- e.g. Pinot 2012



Trough at 260nm and 280nm
Peak at 320nm

Results: Stored carbohydrates

		Cane starch (mg/g)	
		2010	2011
Pinot Noir	Cane pruned	77.81	53.20
	Spur pruned	71.64	64.07
	Significance	ns	<0.01
Chardonnay	Cane pruned	78.53	56.02
	Spur pruned	80.03	54.70
	Significance	ns	ns

- Expected to see a difference in overwintering starch but we didn't (except in 2011 Pinot Noir vines)
- Also no significant difference in soluble sugars between pruning treatments
- Large seasonal difference in stored starch and soluble sugars
- NB starch measured in 2011 is what is available for budburst and inflorescence size development for 2012 vintage

Seasonal climate data

	Vintage		
	2010	2011	2012
Mean January Temp ° C	23.8	22.7	23.7
Growing Degree Days (Oct – Apr)	1291.1	1110	1247.8
Growing Season Rain (mm) (Oct – Apr)	331.6	345.4	296.6

- Helps to explain yield and carbohydrate results

In summary...

- Spur pruned canopies established more quickly and were more even
- Spur pruned vines had a greater number of smaller bunches, however yield per vine was not significantly different
- Basic juice quality parameters were not significantly different
- Base wine spectra showed distinct separation between pruning systems
- Spectral fingerprints suggest effects on low MW phenolics eg Hydroxycinnamates
- Very little difference in stored carbohydrates

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